

EPSIM - An Integrated Sequential Interindustry Model for Energy Planning: evaluating economic, electrical, environmental and health dimensions of new power plants

Topic: Trade and supply chains

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Energy is the input on which modern society depends the most for life standard maintenance besides economic and social activities, however, it is also one of the major sources of greenhouse gases (GHG) emissions, especially the electric sector, due to a world energy matrix concentrated on oil and coal resources. Hereby, impact analysis is essential for policy making focused on sustainable energy systems, once it provides ex ante evaluations for the diverse effects of new projects, being especially important in relation to large infra-structure investments as power plants. In Brazilian case, although the current electrical matrix is primarily renewable and has low GHG intensity, the required expansion of generation capacity leads to rediscuss power plants' alternatives and their externalities. Due to the transient and heterogeneous demand of these projects, economic, environmental, energy and social impacts must be assessed dynamically and spatially. This study introduces a social-environmental economic model, based on Regional Sequential Interindustry Model integrated with geoprocessing data, in order to identify economic, pollution and public health impacts in state and county levels for energy planning analysis. Integrating I-O framework with electrical and dispersion models, dose-response functions and GIS data, this model aims to expand policy makers' scope of analysis and provide an auxiliary tool to assess energy planning scenarios in Brazil. Moreover, a case study for wind power plants in Brazil is performed to illustrate its usage.